

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA12 | Waddesdon and Quainton

Operational assessment (SV-004-012)

Sound, noise and vibration

November 2013

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA12 | Waddesdon and Quainton

Operational assessment (SV-004-012)

Sound, noise and vibration

November 2013



Department
for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

A report prepared for High Speed Two (HS2) Limited.

High Speed Two (HS2) Limited,
Eland House,
Bressenden Place,
London SW1E 5DU

Details of how to obtain further copies are available from HS2 Ltd.

Telephone: 020 7944 4908

General email enquiries: HS2enquiries@hs2.org.uk

Website: www.hs2.org.uk

High Speed Two (HS2) Limited has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full on the HS2 website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard please contact High Speed Two (HS2) Limited.



Printed in Great Britain on paper
containing at least 75% recycled fibre.

Appendix SV-004-012

Environmental topic:	Sound, noise and vibration	SV
Appendix name:	Operation assessment	004
Community forum area:	Waddesdon and Quainton	012

Contents

1	Introduction	3
1.1	Structure of the sound, noise and vibration appendices	3
1.2	Evaluation of impacts and effects	3
2	Scope, assumptions and limitations	5
2.1	Regional and local policy guidance	5
2.2	Engagement	5
2.3	Methodology	5
2.4	Assumptions	6
2.5	Local limitations	6
3	Environmental baseline	7
3.1	Existing baseline	7
3.2	Future baseline	7
4	Effects arising during operation	8
4.1	Introduction	8
4.2	Avoidance and mitigation measures	8
4.3	Quantitative identification of impacts and effects	8
4.4	Assessment of impacts and effects	19

List of tables

Table 1: Ground-borne sound and vibration levels, noise and vibration impacts and effects.....	10
Table 2: Summary of operational ground-borne noise and vibration impacts.....	11
Table 3:: Operational airborne noise impact and effects	13
Table 4: Summary of operational airborne sound impacts.....	19

1 Introduction

1.1 Structure of the sound, noise and vibration appendices

- 1.1.1 The sound, noise and vibration appendices comprise four sections. The first of these details the methodology used (Appendix SV-001-000) and relates to the sound, noise and vibration assessment for all community forum areas (CFA).
- 1.1.2 For the Waddesdon and Quainton community forum area (CFA12), the other three sections are as follows:
- baseline sound, noise and vibration (Appendix SV-002-012);
 - construction sound, noise and vibration (Appendix SV-003-012); and
 - operational sound, noise and vibration (Appendix SV-004-012) (this appendix).
- 1.1.3 The outcomes of this assessment are summarised in Volume 2: CFA12 Report, Chapter 11 Sound, Noise and Vibration.
- 1.1.4 Maps referred to throughout the sound, noise and vibration appendices are contained in the Volume 5 sound, noise and vibration map book.
- 1.1.5 This appendix presents the likely noise and vibration impacts, effects and significant effects arising from the operation of the Proposed Scheme for the Waddesdon and Quainton area on:
- people, primarily where they live ('residential receptors') in terms a) individual dwellings and b) on a wider community basis, including any shared community spaces; and
 - community facilities such as schools, hospitals, places of worship, and also commercial properties such as offices and hotels, collectively described as 'non-residential receptors' and 'quiet areas'.
- 1.1.6 The assessment of likely impacts, effects and significant effects from operational noise and vibration on agricultural, community, ecological or heritage receptors and the assessment of tranquillity are presented in the following documents within Volume 5:
- Agriculture, forestry and soils Appendix AG-001-012
 - Community Appendix CM-001-012
 - Ecology Appendix EC-005-002
 - Heritage Appendix CH-003-012
 - Landscape and Visual Appendix LV-001-012

1.2 Evaluation of impacts and effects

- 1.2.1 This appendix provides a quantitative assessment of operational noise and vibration impacts and effects and a qualitative assessment of likely significant effects, based on the impacts and effects identified and other local context information consistent with the scope and methodology defined for the Proposed Scheme.

- 1.2.2 Indirect effects arising from permanent changes in traffic patterns on the existing road and rail networks as a consequence of the Proposed Scheme are also reported in this appendix, where they would occur within the study area as defined in Volume 5: Appendix SV-001-000.
- 1.2.3 Route-wide impacts, effects and significant effects associated with noise or vibration from the operation of the Proposed Scheme are reported in Volume 3.
- 1.2.4 Off-route effects of noise or vibration arising from the operation of the Proposed Scheme, including those likely to arise from permanent changes in traffic patterns on roads or railways outside of the study area for direct effects are reported in Volume 4.
- 1.2.5 In undertaking the assessment of sound, noise and vibration, consistent with EIA Regulations and emerging National Planning Practice Guidance¹ a differentiation between impacts effects, adverse effects and significant effects is made. Further information is provided in Volume 5: Appendix SV001-000.
- 1.2.6 The assessment of impacts has been undertaken at assessment locations that are representative of a number of dwellings or other sensitive receptors. The Assessment Locations employed in this assessment are presented on map series Sv-02 in the CFA12 Volume 5 sound, noise and vibration map book.

¹ National Planning Practice Guidance – Noise <http://planningguidance.planningportal.gov.uk> ; refer to the table summarising noise exposure hierarchy

2 Scope, assumptions and limitations

2.1 Regional and local policy guidance

2.1.1 The policy framework for sound, noise and vibration is set out in Volume 1 and in Appendix SV-001-000. As part of the engagement with local authorities through the Planning Forum Sub Group (Acoustics), information regarding any specific local planning guidance in respect of noise and vibration has been requested. Whilst no information has been received for this study area via the Planning Forum Sub Group - Acoustics, the following local policy guidance on noise and vibration has been identified:

- Aylesbury Vale District Local Plan - Jan 2004.

2.1.2 This guidance has been considered as part of formulating the detailed application of the impact and significance criteria set out in Volume 5, Appendix SV-001-000.

2.2 Engagement

2.2.1 Details of engagement on a route-wide basis with the local and county authorities' Environmental Health Practitioners via the Planning Forum Sub Group - Acoustics, is set out in Volume 1, Section 8.

2.2.2 Engagement with communities has been via the Community Forums, as set out in Volume 1. In respect of sound, noise and vibration the following discussions have taken place:

- general discussions in respect of local issues, including possible ways to avoid and mitigate the potential impacts of noise or vibration
- September / October 2012; a specific presentation about sound, noise and vibration with discussion afterwards with one of the project team specialists;
- November / December 2012; specific request for the Community Forum to propose baseline sound monitoring locations;
- January / February 2013; feedback to the Community Forum on any proposed baseline monitoring locations; and
- verbal / written response to questions on sound, noise and vibration.

2.3 Methodology

2.3.1 The methodology used for the assessment of airborne sound, ground-borne sound and vibration impacts and the determination of significant effects is defined in the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1), is clarified in a number of areas by the SMR addendum (Volume 5: Appendix CT-001-000/2). Further information is contained in Volume 5: Appendix SV-001-000.

2.4 Assumptions

- 2.4.1 Route-wide assumptions are outlined in Volume 1, Section 8, and are further detailed in Volume 5: Appendix SV-001-000. Local assumptions that apply to the assessment of operational sound noise and vibration within this CFA are set out in Volume 2:Report 12.

2.5 Local limitations

- 2.5.1 In this area, there are a number of locations where the land or property owners did not permit baseline sound level monitoring to be undertaken at their premises. However, sufficient information has been obtained to undertake the assessment. Further information is provided in Volume 5: Appendix SV-002-012.

3 Environmental baseline

3.1 Existing baseline

- 3.1.1 Baseline sound level data has been collected at locations representative of the airborne sound-sensitive receptors. The existing and future baseline airborne sound levels derived from these measurements are included within Table 3. Details of the baseline data collection and the methodology are given in Volume 5: Appendix SV-001-000 and specifically for this study area in Volume 5: Appendix SV-002-012.
- 3.1.2 The majority of receptors adjacent to the line of the route are not currently subject to appreciable vibration and therefore vibration at all receptors has been assessed using the absolute vibration criteria as described in Volume 5: Appendix SV-001-000.

3.2 Future baseline

- 3.2.1 The assessment is based upon the predicted change in sound levels that result from the Proposed Scheme. The assessment initially considered a reasonable worst case (that would overestimate the change in levels) by assuming that sound levels would not change from the existing baseline year of 2012/2013. Where significant effects were identified on this basis, the effects have been assessed using the baseline year of 2026 to coincide with the proposed start of passenger services. The future baseline is for the sound environment that would exist in 2026 without the Proposed Scheme.

4 Effects arising during operation

4.1 Introduction

4.1.1 The assessment is reported first for ground-borne sound and vibration and then for airborne sound. Under each of these headings, the results of the quantitative identification of impacts and effects are presented. This is followed by the identification of significant effects and the evidence used to support these conclusions.

4.1.2 The structure of this assessment report is:

- Avoidance and mitigation measures
- Quantitative identification of impact and effects
 - Ground-borne sound and vibration
 - Residential
 - Non-residential
 - Airborne sound
 - Residential
 - Non-residential
- Assessment of impacts and effects
 - Residential receptors: direct effects – dwellings
 - Residential receptors: direct effects – communities
 - Residential receptors: indirect effects
 - Non-residential receptors: direct effects
 - Non-residential receptors: indirect effects
 - Cumulative effects from the proposed scheme and other committed development.

4.2 Avoidance and mitigation measures

4.2.1 These are set out in Volume 2: Report 12.

4.3 Quantitative identification of impacts and effects

Ground-borne sound and vibration

4.3.1 Assessment locations defined for the quantitative assessment of impacts are shown on map series SV-02 in the CFA12 Volume 5 sound, noise and vibration map book.

4.3.2 For each Assessment Location, the assessment results for residential and non-residential receptors are presented in Table 1. Explanation of the information in Table 1 is provided in Appendix SV-001-000, with the following additional notes.






B	For non-residential receptors further detail about the type of effect is set out in the text of Volume 5: Appendix SV-001-000.
NA	Type of effect - Generally no adverse effect
A	Type of effect - Adverse effect
S	Type of effect - Significant adverse effect
VDV	Vibration Dose Value
~	The forecast adverse effects are not considered to be significant on a community basis (further information on methodology is provided in Volume 5: Appendix SV-001-000).
^	The impact methodology has identified a potential significant effect at this receptor which based upon further qualitative information is not considered to be a likely significant effect. Please refer the end of this Appendix for further information.
	Where the significant effect column is highlighted in pink, then a significant effect is identified at the referenced residential community area, or individual receptor.
	Yellow denotes a low ground-borne noise impact or a minor ground-borne vibration impact
	Orange denotes a medium ground-borne noise impact or a moderate ground-borne vibration impact
	Red denotes a high ground-borne noise impact or a major ground-borne vibration impact
	Dark red denotes a very high ground-borne noise impact

Table 1: Ground-borne sound and vibration levels, noise and vibration impacts and effects

Assessment location		Impact criteria				Significance criteria								Significant effect
		Ground-borne sound level dB L _{pASmax}	VDV m/s ^{1.75} Daytime (07:00 - 23:00)	VDV m/s ^{1.75} Night time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
ID	Area represented													
298562	Quainton, Aylesbury	-	0.28	0.14	-	3	A	R	T	-	-	-	-	~
291320	Quainton, Aylesbury	-	0.07	0.04	-	1	NA	R	T	-	-	-	-	
298562	Woodlands Farm, Quainton, (General Commercial)	-	0.28	0.14	-	1	B	G4/V3	T	-	-	-	-	
298562	Quainton, (General Commercial)	-	0.28	0.14	-	1	B	G4/V3	T	-	-	-	-	

Impact summary





- 4.3.3 The operational ground-borne noise and vibration impacts identified in Table 1 are summarised in Table 2.

Table 2: Summary of operational ground-borne noise and vibration impacts

	Number of ground-borne sound impacts			
	Low	Medium	High	Very High
Residential properties	0	0	0	0
Non-residential properties	0			0
	Number of ground-borne vibration impacts			
	Minor	Moderate	Major	Risk of building damage
Residential properties	3	0	0	0
Non-residential properties	0			0

Airborne sound: direct impacts and effects

- 4.3.4 The direct effects from the operation of the Proposed Scheme as well as any new, amended or altered roads or railway lines, which are identified as part of the scheme, are presented in Table 3.
- 4.3.5 The assessment information, impact criteria and significance criteria for the assessment of the incorporated mitigation case at residential and non-residential receptors are presented in Table 3. The results should be considered in conjunction with the information contained in map series Sv-02 in the CFA12 Volume 5 sound, noise and vibration map book.
- 4.3.6 Explanation of the Table 3 information is provided in Volume 5: Appendix SV001-000, with the following additional notes.

	Where the significant effect column is marked, then a significant effect is identified at the referenced group of dwellings, or individual residential or non-residential receptor.
	Yellow denotes a minor impact at a residential building – a change is of 3-5 dB
	Orange denotes a moderate impact at a residential building – a change is of 5-10 dB
	Red denotes a major impact at a residential building – a change is of >10 dB
*	Day - $L_{pAeq,07:00-23:00}$
**	Night - $L_{pAeq,23:00-07:00}$
***	Max - L_{pAFmax} In the Proposed Scheme only column, two values are presented. The first is the value for the HS2 mitigated train and the second is the value for the TSI compliant train. For further information refer to Volume 5: Appendix SV-001-000.
****	Where the Proposed Scheme modifies an existing source, i.e. road or railway realignments, the <i>Proposed Scheme only</i> level in the table includes the sound from the modified source. In this situation the <i>Do something (Opening year baseline + Year 15 traffic)</i> level has been corrected so as to not double count the sound associated with the road or railway on its new and existing alignment.
A	Adverse effect
B	For non-residential receptors further detail about the type of effect is set out in the text of Appendix SV-001-000.
CD	Committed Development. The value in brackets in the number of impacts represented column is the value with the committed development.

G	(G1)Theatres, large auditoria and concert halls, (G2) Sound recording and broadcast studios, (G3) Places of meeting for religious worship, courts, cinemas, lecture theatres, museums and small auditoria or halls, (G4) Schools, colleges, hospitals, hotels and libraries, and (G5) Offices and general commercial premises
H	High existing ambient sound level. Defined as $>65\text{dB}L_{\text{Aeq, day}}$ and/or $>55\text{dB}L_{\text{Aeq, night}}$
L	Low existing ambient sound level. Defined as $<42\text{dB}L_{\text{Aeq, day}}$ and/or $<32\text{dB}L_{\text{Aeq, night}}$
LD	Landscape receptor
NA	Generally no adverse effect
NI	The receptor is predicted to qualify for mitigation, which shall be provided to the specification defined in the Noise Insulation (Railways and other Guided Rail Systems) Regulations 1996
R	Residential
RM	Residential mooring
S	Significant adverse effect
U	Unacceptable adverse effect
#	A change of 3dB or greater has been identified however, the assessment methodology only defines an impact where the absolute sound level from the Proposed Scheme is greater or equal to 50 dB $L_{\text{pAeq, 23:00} - 07:00}$ during the daytime or 40 dB $L_{\text{pAeq, 07:00} - 23:00}$ at night. At the receptor denoted the absolute level condition is not met and therefore no impact is identified.
~	The forecast adverse effects are not considered to be significant on a community basis (further information on methodology is provided in Volume 5: Appendix SV-001-000)..
\$	A change of 3dB or greater has been identified however, the impact methodology for non-residential receptors includes a screening criteria for G3 building use of 50 dB $L_{\text{pAeq, 07:00} - 23:00}$, for G4 building use 55 dB $L_{\text{pAeq, 07:00} - 23:00}$ and 45 dB $L_{\text{pAeq, 23:00} - 07:00}$, for G5 building use 55 dB $L_{\text{pAeq, 07:00} - 23:00}$. At the receptor denoted the screening criteria is not met and therefore no impact is identified. Further information is provided in Volume 5: Appendix SV-001-000.
^	The impact methodology has either identified an impact at a receptor which based upon further qualitative information does not gives rise to a significant effect. Further information is provided at the end of this Appendix.

Table 3:: Operational airborne noise impact and effects

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic + adjustments)		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
286675	Edgcott, Aylesbury	51	42	63/66	46	39	50	52	44	7	5	A	2	R	T	-	-	-	-	~
286717	Edgcott, Aylesbury	50	41	62/65	46	39	50	51	43	6	4	A	1	R	T	-	-	-	-	~
290161	Taylor's Corner, Waddesdon	49	40	63/66	46	39	64	50	42	4	3	A	10	R	T	-	-	-	-	~
290385	Doddershall, Quainton	59	50	71/74	46	38	47	60	50	14	13	A	1	R	T	-	-	-	-	~
290441	Doddershall, Quainton	49	40	63/66	46	38	47	51	42	5	4	A	1	R	T	-	-	-	-	~
290916	Bicester Road, Waddesdon	45	36	58/61	55	47	55	55	48	0	0	NA	2	R	T	-	-	-	-	
291320	Quainton, Aylesbury	71	62	85/88	60	53	62	72	63	12	10	S	1	R	T	-	-	-	NI	OSV12-D01
291382	Station Road, Quainton	50	41	62/66	50	43	52	50	41	0	-2	A	9	R	T	-	-	-	-	
291492	Doddershall, Quainton	44	35	55/58	46	38	47	48	39	2	2	NA	1	R	T	-	-	-	-	
291511	Station Road, Quainton	54	45	67/71	60	53	62	61	53	1	0	A	2	R	T	-	-	-	-	
291754	Goss Avenue, Waddesdon	42	34	54/57	67	59	85	67	59	0	0	NA	20	R	T	H	-	-	-	
291885	Sharps Close, Waddesdon	43	35	52/55	51	45	51	51	45	0	0	NA	64	R	T	-	-	-	-	
292062	Warmstone Close, Waddesdon	50	42	52/55	51	45	51	50	45	-1	-1	A	41	R	T	-	-	-	-	
292369	Sharps Close, Waddesdon	38	30	49/52	66	59	85	66	59	0	0	NA	30	R	T	H	-	-	-	
292489	High Street, Waddesdon	43	35	54/57	79	71	85	79	71	0	0	NA	9	R	T	H	-	-	-	
292667	High Street, Waddesdon	41	33	55/58	71	64	76	71	64	0	0	NA	45	R	T	H	-	-	-	
293404	Frederick Street, Waddesdon	40	32	52/55	61	54	76	61	54	0	0	NA	21	R	T	-	-	-	-	
293570	High Street, Waddesdon	42	34	54/57	47	36	44	48	38	1	2	NA	56	R	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic + adjustments)		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
293650	Little Britain, Waddesdon	42	33	55/58	51	42	53	51	42	1	1	NA	39	R	T	-	-	-	-	
293784	Anstey Close, Waddesdon	41	32	52/55	50	43	52	50	44	0	0	NA	5	R	T	-	-	-	-	
293796	Anstey Close, Waddesdon	48	40	54/57	68	60	85	68	60	0	0	A	4	R	T	H	-	-	-	
293964	Baker Street, Waddesdon	40	31	52/55	66	59	76	66	59	0	0	NA	17	R	T	H	-	-	-	
294049	Quainton Road, Waddesdon	53	44	69/72	50	43	52	55	47	5	3	A	1	R	T	-	-	-	-	~
294165	Quainton Road, Waddesdon	49	40	64/67	46	39	64	51	42	5	3	A	3	R	T	-	-	-	-	~
294193	Quainton Road, Waddesdon	47	38	63/66	60	49	64	60	49	0	0	NA	10	R	T	-	-	-	-	
294430	Frederick Street, Waddesdon	46	38	60/63	48	39	63	50	41	2	2	NA	55	R	T	-	-	-	-	
294499	Frederick Street, Waddesdon	44	35	59/62	47	36	44	49	39	2	2	NA	89	R	T	-	-	-	-	
294777	Quainton Road, Waddesdon	47	38	61/64	43	33	40	47	38	5	5	NA	15	R	T	L	-	-	-	#
294910	New Street, Waddesdon	45	36	60/63	47	36	44	49	39	2	3	NA	21	R	T	-	-	-	-	#
295086	Little Britain, Waddesdon	44	36	59/62	47	45	49	49	46	2	0	NA	9	R	T	-	-	-	-	
295181	Anstey Close, Waddesdon	41	32	51/54	50	43	52	50	44	0	0	NA	8	R	T	-	-	-	-	
295222	Little Britain, Waddesdon	48	40	60/63	47	45	49	50	46	3	1	A	31	R	T	-	-	-	-	#
295618	Station Road, Quainton	45	36	56/59	52	46	45	52	47	1	0	NA	20	R	T	-	-	-	-	
295689	Station Road, Quainton	42	33	52/57	52	46	45	52	46	0	0	NA	15	R	T	-	-	-	-	
295776	Station Road, Quainton	43	34	55/59	52	46	45	52	46	1	0	NA	14	R	T	-	-	-	-	
295872	Station Road, Quainton	48	39	58/62	52	46	45	53	47	1	0	NA	11	R	T	-	-	-	-	
296529	Quainton, Aylesbury	56	46	69/72	46	39	50	56	47	10	8	A	1	R	T	-	-	-	-	~
296784	Edgcott, Aylesbury	65	56	78/81	46	39	50	65	56	19	17	S	1	R	T	-	-	-	NI	OSV12-D02

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic + adjustments)		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
296808	Edgcott, Aylesbury	68	58	81/84	46	39	50	68	58	22	20	S	1	R	T	-	-	-	NI	OSV12-Do3
296850	Calvert Road, Middle Claydon	47	38	61/64	46	39	50	49	41	4	3	NA	1	R	T	-	-	-	-	#
296997	Doddershall, Quainton	42	32	52/55	46	39	50	47	40	1	1	NA	2	R	T	-	-	-	-	
297008	Quainton, Aylesbury	63	54	78/81	53	42	45	63	54	10	12	S	2	R	T	-	-	-	NI	OSV12-Do4
297063	Finemerehill House, Grendon Underwood	55	46	62/65	46	39	50	55	46	10	8	A	1	R	T	-	-	-	-	~
297078	Doddershall, Quainton	53	44	67/70	46	38	47	54	45	8	7	A	2	R	T	-	-	-	-	~
297144	Doddershall, Quainton	55	45	69/72	46	38	47	55	46	9	8	A	3	R	T	-	-	-	-	~
297166	Doddershall, Quainton	60	51	72/75	46	38	47	60	51	14	14	A	1	R	T	-	-	-	-	~
297249	Quainton, Aylesbury	51	41	63/66	49	39	45	53	43	4	4	A	1	R	T	-	-	-	-	~
297256	Quainton, Aylesbury	49	40	61/64	49	39	45	52	43	3	4	A	2	R	T	-	-	-	-	~
298562	Quainton, Aylesbury	76	66	91/94	45	39	45	76	66	31	28	U	3	R	T	-	-	Y	NI	OSV12-Do5
310373	Aylesbury Road, Waddesdon	53	45	65/69	62	55	55	53	45	-9	-10	A	1	R	T	H	-	-	-	
310474	Blackgrove Road, Waddesdon	53	54	59/62	49	52	53	53	54	4	2	A	1	R	T	-	-	-	-	~
310687	Waddesdon, Aylesbury	58	50	68/71	55	47	55	59	50	4	3	A	2	R	T	-	-	-	-	~
310700	Fleet Marston, Aylesbury	56	47	66/70	55	47	55	57	49	3	2	A	1	R	T	-	-	-	-	~
310792	Waddesdon, Aylesbury	52	45	63/66	55	47	55	56	48	1	1	A	3	R	T	-	-	-	-	
700346	Blackgrove Road, Waddesdon	59	51	71/74	49	52	53	59	51	10	-1	A	1	R	T	-	-	-	-	~
700348	Aylesbury Road, Waddesdon	52	45	60/63	50	43	52	52	45	2	1	A	1	R	T	-	-	-	-	~

Assessment Location		Impact criteria										Significance criteria									Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic + adjustments)		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect		
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **										
901018	Finemere Wood	52	42	65/68	46	39	50	53	44	7	5	A	-	LD	-	-	-	-	-		
901019	Finemere Hill	45	35	52/55	46	39	50	48	40	2	2	A	-	LD	-	-	-	-	-		
901020	Greatsea Wood	45	35	56/59	46	39	50	48	40	2	2	A	-	LD	-	-	-	-	-		
901021	Baltimore Wood	36	26	46/49	46	39	50	46	39	0	0	A	-	LD	-	-	-	-	-		
901022	Romer Wood	51	41	61/64	46	39	50	52	43	6	5	A	-	LD	-	-	-	-	-		
901023	Sheephouse Wood South	63	54	77/80	46	39	50	63	54	17	15	A	-	LD	-	-	-	-	-		
901024	Sheephouse Wood North	54	45	66/69	46	39	50	55	46	9	7	A	-	LD	-	-	-	-	-		
901025	Knowl Hill	45	36	58/61	46	39	50	49	40	3	2	A	-	LD	-	-	-	-	-		
901026	Shrubs Wood	44	35	56/59	55	46	51	55	47	0	0	A	-	LD	-	-	-	-	-		
901027	Knowl Hill Valley	37	28	49/52	46	39	50	46	39	1	0	A	-	LD	-	-	-	-	-		
286717	Edgcott House, Edgcott (Office)	50	41	62/65	46	39	50	51	43	6	4	B	2	G5	T	-	-	-	-	\$	
289842	Buckinghamshire Railway Centre (Transport Museum)	53	44	65/69	60	53	62	61	53	1	0	B	1	G3	T	-	-	-	-		
289842	Station Road, Quainton (General Commercial)	53	44	65/69	60	53	62	61	53	1	0	B	1	G5	T	-	-	-	-		
291492	Fieldside Farm, Doddershall (General Commercial)	44	35	55/58	46	38	47	48	39	2	2	B	8	G5	T	-	-	-	-		
291511	Station Road, Quainton (General Commercial)	54	45	67/71	60	53	62	61	53	1	0	B	1	G5	T	-	-	-	-		
291754	Goss Avenue, Waddesdon (Surgery)	42	34	54/57	67	59	85	67	59	0	0	B	1	G4	T	H	-	-	-		

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic + adjustments)		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
292062	Warmstone Lane (Engineering Works)	50	42	52/55	51	45	51	50	45	-1	-1	B	1	G5	T	-	-	-	-	
292667	High Street, Waddesdon (Restaurant)	41	33	55/58	71	64	76	71	64	0	0	B	1	G5	T	H	-	-	-	
292667	Fire Station, High Street, Waddesdon (Fire Station)	41	33	55/58	71	64	76	71	64	0	0	B	1	G4	T	H	-	-	-	
292667	High Street, Waddesdon (Post Office)	41	33	55/58	71	64	76	71	64	0	0	B	2	G5	T	H	-	-	-	
292667	Police Station, High Street, Waddesdon (Police Services)	41	33	55/58	71	64	76	71	64	0	0	B	1	G4	T	H	-	-	-	
293404	The Hart Veterinary Centre (Veterinary Surgery)	40	32	52/55	61	54	76	61	54	0	0	B	1	G5	T	-	-	-	-	
293404	Frederick Street (General Commercial)	40	32	52/55	61	54	76	61	54	0	0	B	1	G5	T	-	-	-	-	
293570	Styles House, Wood Street (General Commercial)	42	34	54/57	47	36	44	48	38	1	2	B	1	G5	T	-	-	-	-	
294430	Quainton Road, Waddesdon (General Commercial)	46	38	60/63	48	39	63	50	41	2	2	B	1	G5	T	-	-	-	-	
294777	The Mill, Quainton Road (General Commercial)	47	38	61/64	43	33	40	47	38	5	5	B	1	G5	T	L	-	-	-	\$
294910	New Street, Waddesdon (General Commercial)	45	36	60/63	47	36	44	49	39	2	3	B	4	G5	T	-	-	-	-	\$
298562	Woodlands Farm, Quainton (General Commercial)	76	66	91/94	45	39	45	76	66	31	28	B	2	G5	T	-	-	-	-	^

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic + adjustments)		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
700348	Aylesbury Road, Waddesdon (General Commercial)	52	45	60/63	50	43	52	52	45	2	1	B	1	G5	T	-	-	-	-	\$

Direct impact - Summary

4.3.7 The operational airborne noise impacts identified in Table 3 are summarised in Table 4.

Table 4: Summary of operational airborne sound impacts

Receptor	Number of impacts		
	Minor	Moderate	Major
Residential properties	21	9	13
Non-residential properties	0	0	2
Quiet areas	None	None	None

4.4 Assessment of impacts and effects

Residential receptors: direct effects - individual buildings

- 4.4.1 Taking account of the avoidance and mitigation measures incorporated into the Proposed Scheme, the assessment has identified approximately six residential dwellings close to the Proposed Scheme at: Crossroads Farm, Woodlands Barn, Woodlands Farmhouse, and Woodlands Lodge near Quainton; and at Upper Greatmoor Farm and Lower Greatmoor Farm near Edgcott, where noise would exceed the daytime trigger threshold set in the Regulations. It is therefore estimated that these buildings are likely to qualify for noise insulation under the Regulations. These dwellings are indicated in Map Series SV-02 (Volume 5, CFA12 Map Book).
- 4.4.2 The assessment has identified two additional residential buildings close to the Proposed Scheme: at 1 and 2 Woodlands Farm Cottages near Quainton, where the daytime forecast noise level does not exceed the threshold set in the Regulations but the forecast night-time noise level would exceed the World Health Organization's Interim Target of 55dB², or the maximum noise level (dependent on the number of train passes) as a train passes exceeds the criterion. It is estimated that these buildings will also be offered noise insulation as described in the Avoidance and mitigation measures section of Volume 2: Report 12. These buildings are indicated in Map Series SV-02 (Volume 5, CFA12 Map Book).
- 4.4.3 The mitigation measures including noise insulation will reduce noise inside all dwellings such that it will not reach a level where it would significantly affect residents.

Residential receptors: direct effects –communities

- 4.4.4 The mitigation measures in this area will avoid significant airborne noise effects on the majority of receptors, and at the following communities:
- Waddesdon;
 - Quainton; and

² Equivalent continuous level, L_{pAeq,23:00-07:00} measured without reflection from the front of buildings

- Edgcott.

- 4.4.5 Taking account of the envisaged mitigation, Map Series SV-02 (Volume 5, CFA12 Map Book) shows the long term 40dB³ night-time sound level contour from the operation of trains on the Proposed Scheme. The extent of the 40dB night-time sound level contour is equivalent to, or slightly larger than, the 50dB daytime contour⁴. In general, below these levels adverse effects are not expected.
- 4.4.6 Above 40dB during the night or 50dB during the day the effect of noise is dependent on the baseline sound levels in that area and the change in sound level (magnitude of effect) brought about by the Proposed Scheme. The airborne noise impacts and effects forecast for the operation of the scheme are presented in Map Series SV-02 (Volume 5, CFA12 Map Book).
- 4.4.7 The changes in noise levels are likely to affect the acoustic character of the area such that there is a perceived change in the quality of life and are considered to be significant when assessed on a community basis⁵ taking account of the local context.
- 4.4.8 In this study area, the assessment indicates that none of the direct adverse effects⁶ on the areas of residential communities in the Waddesdon and Quainton area are considered to be significant.
- 4.4.9 Three isolated properties within the study area have been identified as being subject to an observed adverse vibration effect; these effects are likely to be considered as an effect on the acoustic character of the area such that there is a perceived change in the quality of life. However, as the affected properties are spatially remote from larger defined residential areas, are subject to smaller magnitudes of vibration effect, or are small in number, the effects are not considered to be significant.
- 4.4.10 Approximately 35 isolated properties within the study area have been identified as being subject to an observed adverse noise effect; these effects are likely to be considered as an effect on the acoustic character of the area such that there is a perceived change in the quality of life. However, as the affected properties are spatially remote from larger defined residential areas, are subject to smaller magnitudes of noise effect, or are small in number, the effects are not considered to be significant.

Residential receptors: indirect effects

- 4.4.11 The transport assessment presented in Volume 5: Appendix TR-001-000, has been used to identify those roads or railways within this study area where the alignment remains as at present, but a change in flow or composition is identified which is greater than the screening criteria defined in Volume 5: Appendix SV-001-000. No roads or railways which exceed the criteria defined in Volume 5: Appendix SV-001-000 have been identified in this study area.

³ Defined as the equivalent continuous sound level from 23:00 to 07:00 or $L_{pAeq,night}$)

⁴ With the train flows described in the assumptions section of this CFA Report, the daytime sound level (defined as the equivalent continuous sound level from 07:00 to 23:00 or $L_{pAeq,day}$) from the Proposed Scheme would be approximately 10dB higher than the night-time sound level. The 40dB contour therefore indicates the distance from the Proposed Scheme at which the daytime sound level would be 50dB.

⁵ Further information is contained in Volume 1.

⁶ Information is provided in the emerging National Planning Practice Guidance – Noise <http://planningguidance.planningportal.gov.uk>

- 4.4.12 The assessment of operational noise and vibration indicates that significant indirect effects on residential receptors are unlikely to occur in this area.

Non-residential receptors: direct effects

- 4.4.13 The assessment has identified airborne noise impacts at Woodland Farm, represented by receptor reference 298562.

Woodlands Farm

- 4.4.14 A major impact has been identified based upon the change in the airborne noise level outside this receptor, reference 298562. An assessment has been undertaken to determine if this impact is to result in a likely significant observed adverse noise effect at this non-residential receptor, using the significance criteria detailed in Volume 5: Appendix 001-000.
- 4.4.15 The residential area of the farm has been considered within the residential assessment. The commercial area of this receptor is made up of farm / industrial buildings whose operation is not considered to be noise sensitive, and therefore the non-residential part of Woodlands Farm is not identified as being subject to a significant observed adverse noise effect

Summary

- 4.4.16 The assessment of operational noise and vibration indicates that significant direct effects on non-residential receptors are unlikely to occur in this area.

Non-residential receptors: indirect effects

- 4.4.17 The transport assessment presented in Volume 5: Appendix TR-001-000, has been used to identify those roads or railways within this study area where the alignment remains as at present, but a change in flow or composition is identified which is greater than the screening criteria defined in Volume 5: Appendix SV-001-000. No roads or railways which exceed the criteria defined in Volume 5: Appendix SV-001-000 have been identified in this study area.
- 4.4.18 The assessment of operational noise and vibration indicates that significant indirect effects are unlikely to occur on non-residential receptors in this area.

Cumulative effects

- 4.4.19 Details of properties being currently developed which were afforded planning approval before the safeguarding date are presented in Volume 5: Appendix CT004-000. Within this area, the operational sound, noise or vibration associated with these developments in conjunction with the operation of the Proposed Scheme do not result in any significant cumulative effects.